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Moving object GPS navigation monitoring and alarm device

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Inventeur:	DENG SUI (CN); LIU HUI TONG (CN)
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[73]专利权人 北京军泰科技开发有限责任公司
地址 100080 北京市海淀区海淀街道西苑草场 15 号(海体宾馆)
[72]设计人 邓 穗 刘 晖 童 庆

[21]申请号 99200873.5
[74]专利代理机构 北京科龙环宇专利事务所
代理人 孙皓晨 张爱莲

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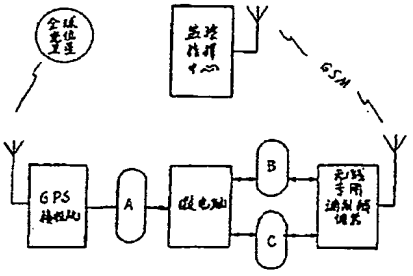
[54]实用新型名称 移动目标 GPS 导航监控及报警装置

[57]摘要

移动目标 GPS 导航监控及报警装置涉及全球定位导航系统 GPS 技术,适用 于运钞车、消防车、救护车、邮车、政府与民用车船等交通工具的导航、监控 及报警装置。目的在于利用全球定位卫星 GPS 信号和已有 GSM 通讯网,而 开发的投资省易普及的移动目标 GPS 导航、监控及报警装置。本装置包括 GP S 接收机,电平转换器 A,微电脑,电平转换器 B 与 C,以及无线专用调制解调器;并装在移动目标上。其效果投资少,易普及,保密性强,可实现全国漫 游。



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权 利 要 求 书

1、一种移动目标GPS导航监控及报警装置，其特征在于该装置包括GPS 接收机，电平转换器A，微电脑，电平转换器B与C，以及利用GSM网的短消息业务与监控指挥中心传输数据的无线专用调制解调器；并装在移动目标上；GPS 接收机输出端经电平转换器A与微电脑输入端连接；微电脑其他输入输出端再经电平转换器B与C， 连接利用GSM网与监控指挥中心传输数据的无线专用调制解调器。

2、根据权利要求1所述的导航监控及报警装置，其特征在于所述转换器A 包括集成电路IC1及其周围元件；集成电路IC1的输入脚19与GPS接收机输出端相接，IC1的输出脚10经RS-232串口与微电脑相连接；IC1的脚26和22接＋5伏电源，电源经电阻R 接LED指示灯，IC1的脚25和23接地，IC1的脚27和3分别经电容接地，IC1的脚1与2 之间和28与24之间分别跨接电容。

3、根据权利要求1所述的导航监控及报警装置，其特征在于所述转换器B 包括集成电路IC2及其周围元件，集成电路IC2的输入脚4、5及6，经RS232接口与微电脑相连接(即TXD, DTR, RTS信号），IC2的输出脚9、10及11，经RS232接口与微电脑相连接（即DCD, RI, CTS信号），IC2的另几个输入脚12、13及14 与无线专用调制解调器相连接（即RIDCD, CTS信号），IC2的另几个输出脚19、18及17与无线专用调制解调器相连接(即TXD, DTR, RTS信号)；IC2的脚26和22接＋5伏电源，电源经电阻R1接LED指示灯，IC2的脚25和23接地，IC2的脚27和3分别经电容接地，IC2的脚1与2之间和28与24 之间分别跨接电容。

4、根据权利要求1所述的导航监控及报警装置，其特征在于所述转换器C 包括集成电路IC3及其周围元件；集成电路IC3的输入脚12和14，与无线专用调制解调器相连接（即DSR, RXD信号)，IC3的输出脚9和11，与RS232接口连接(即DSR, RXD信号)。IC3的脚26和22接＋5伏电源，电源经电阻R1接LED指示灯，IC3的脚25和23接地，IC3的脚27和3分别经电容接地，IC3的脚1与2之间和28与24之间分别跨接电容。

说　明　书

移动目标GPS导航监控及报警装置

本实用新型涉及全球卫星定位导航系统GPS(Navigation Satellite Timing and Ranging/Global Positioning System)技术，适用于运钞车、消防车、救护车、邮车、政府与民用车船等交通工具的导航、监控及报警装置.

自从美国成功地发射多颗全球定位卫星，提供免费卫星信号服务以来，全球定位导航系统GPS发展十分迅速.然而，很多系统因需要重新建立基站，申请频点，自建独立的地面通讯网，存在耗资高，传输数据保密性差，地域区网很难跨区连网等缺陷，而难于在民用方面普及，致使我国外出车辆被盗和失去监控等事故的发案率持续居高不下，给治安及生产管理埋下隐患.

本实用新型目的在于利用全球定位卫星GPS信号和已有的全球移动通信系统 GSM (Global System for Mobile Communvcations)通讯网，而开发的投资省易普及的移动目标GPS导航、监控及报警装置.

本实用新型目的是这样实现的:

一种移动目标GPS导航、监控及报警装置，其特征在于该装置包括GPS接收机，电平转换器A，微电脑，电平转换器B与C，以及利用GSM网的短消息业务与监控指挥中心传输数据的无线专用调制解调器；并装在移动目标上；GPS 接收机输出端经电平转换器A与微电脑输入端连接；微电脑其他输入输出端再经电平转换器B与C，连接利用GSM网与监控指挥中心传输数据的无线专用调制解调器.

结合附图，进一步说明本实用新型内容

图1　本实用新型的应用示意图;

图2　本实用新型电平转换器A电路图;

图3　本实用新型电平转换器B与C电路图.

图1是移动目标GPS导航、监控及报警装置的应用示意图.本装置包括GPS接收机，电平转换器A，微电脑，电平转换器B与C，以及无线专用调制解调器；并装在移动目标上.GPS接收机输出端经电平转换器A与微电脑输入端连接；微电脑其他输入输出端再经电平转换器B与C，连接利用GSM网传输数据的无线专用调制解调器.

GPS接收机接收的三颗以上不同全球定位卫星的GPS信号，经电平转换器A 进行电平转换，再传给微电脑而进行定位信号处理，实时得出的装有本实用新型移动目标的地理位置数据.这些地理位置数据，经电平转换器B进行电平转换，再传给无线专用调制解调器；最后将这些地理位置数据，经由已有的GSM通讯系统，传给监控指挥中

心．与此同时，也可以把移动目标的运行状态、失盗求救等信号按此过程传给监控指挥中心．相反，监控指挥中心也可对被控移动目标发出地理位置与指挥信号，经 GSM 通讯系统回传给无线专用调制解调器，再与电平转换器B与C进行电平转换，送给微电脑．指挥信号经过微电脑处理后再执行．再由微电脑的其它外接设备显示和控制移动点；从而实现双工通讯方式．微电脑内设有移动目标用户数据库和地理位置数据库、电子地图及指挥信号等数据的处理软件．

图2是本实用新型电平转换器A电路图．该转换器A包括集成电路IC1及其周围元件；集成电路IC1的输入脚19与GPS接收机输出端相接，IC1的输出脚10经RS-232 串口与微电脑相连接；IC1的脚26和22接＋5伏电源，电源经电阻R接LED指示灯，IC1的脚25 和23接地，IC1的脚27和3分别经电容接地，IC1的脚1与2之间和28与24 之间分别跨接电容．

该转换器A将完成TTL电平与RS232接口电平之间的相互转换．

图3是本实用新型电平转换器B与C电路图．该转换器B包括集成电路IC2 及其周围元件，集成电路IC2的输入脚4、5及6，经RS232接口与微电脑相连接（即发送数据TXD，数据终端准备DTR，请求发送RTS信号），IC2的输出脚9、10及11，经RS232接口与微电脑相连接（即载波检测DCD，振铃指示RI，清除发送CTS信号），IC2的另几个输入脚12、13及14与无线专用调制解调器相连接（即RI，DCD，CTS信号），IC2的另几个输出脚19、18及17与无线专用调制解调器相连接（即TXD，DTR，RTS信号）；IC2的脚26和22接＋5伏电源，电源经电阻R1接LED指示灯，IC2的脚25和23接地，IC2的脚27和3分别经电容接地，IC2的脚1与2之间和28与24之间分别跨接电容．

该转换器B将完成TTL电平与RS232接口电平之间的相互转换．

转换器C包括集成电路IC3及其周围元件；集成电路IC3的输入脚12和14， 与无线专用调制解调器相连接（即数据设备准备DSR，接收数据RXD信号），IC3的输出脚9和11，与RS232接口连接（即DSR，RXD信号）．IC3的脚26和22接＋5伏电源，电源经电阻 R1 接LED指示灯，IC3的脚25和23接地，IC3的脚27和3分别经电容接地，IC3的脚1与2 之间和28与24之间分别跨接电容．

该转换器C将完成TTL电平与RS232接口电平之间的转换．

本实用新型优点：

投资少，易普及，保密性强，在GSM网络允许的条件下可实现全国漫游．

实施例　　吉通GPS移动目标导航监控及报警装置．

集成电路IC1、IC2、IC3型号均采用MAX3241；用8通道并行GPS接收机．

采用电压变换器7805，使其输出5伏．

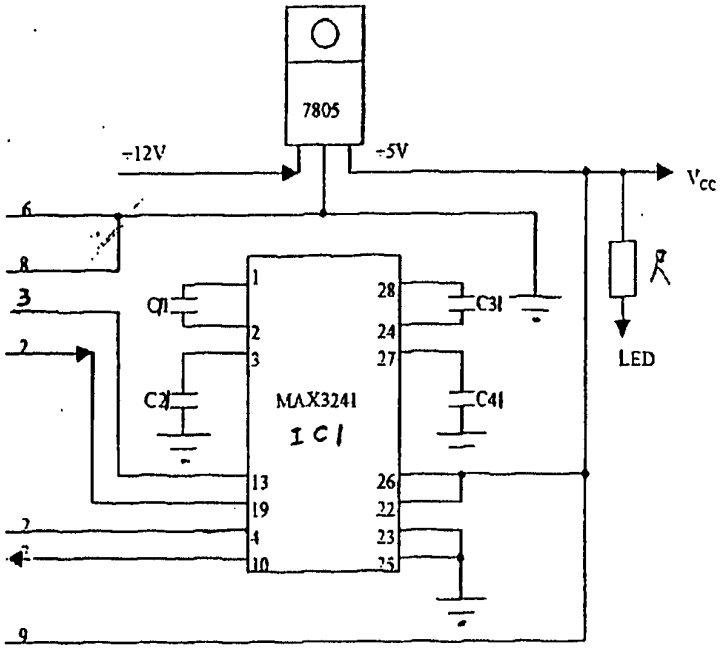
7805
+12V
+5V
V_{cc}
R
LED
MAX3241
IC1
C1
C2
C3
C4

图 2

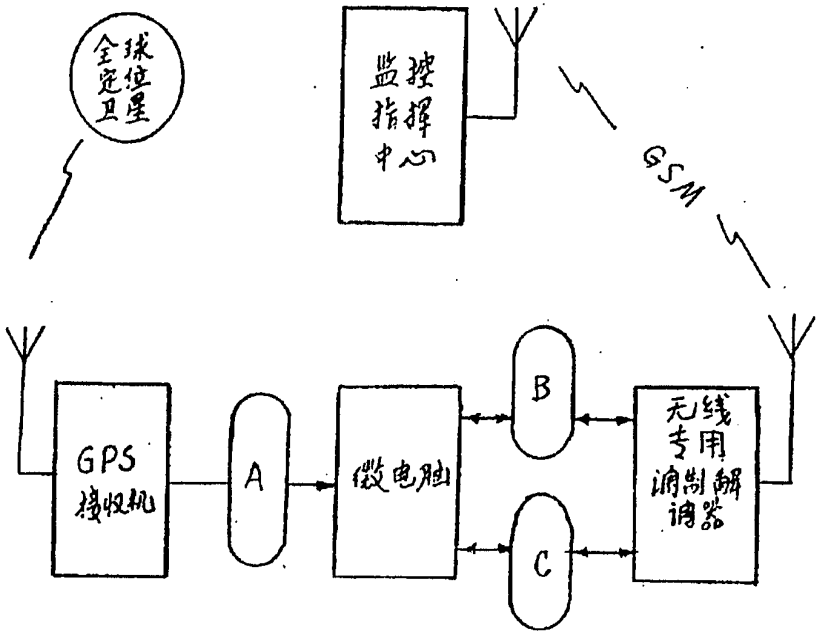
全球定位卫星
监控指挥中心
GSM
GPS接收机
A
微电脑
B
C
无线专用调制解调器

图 1

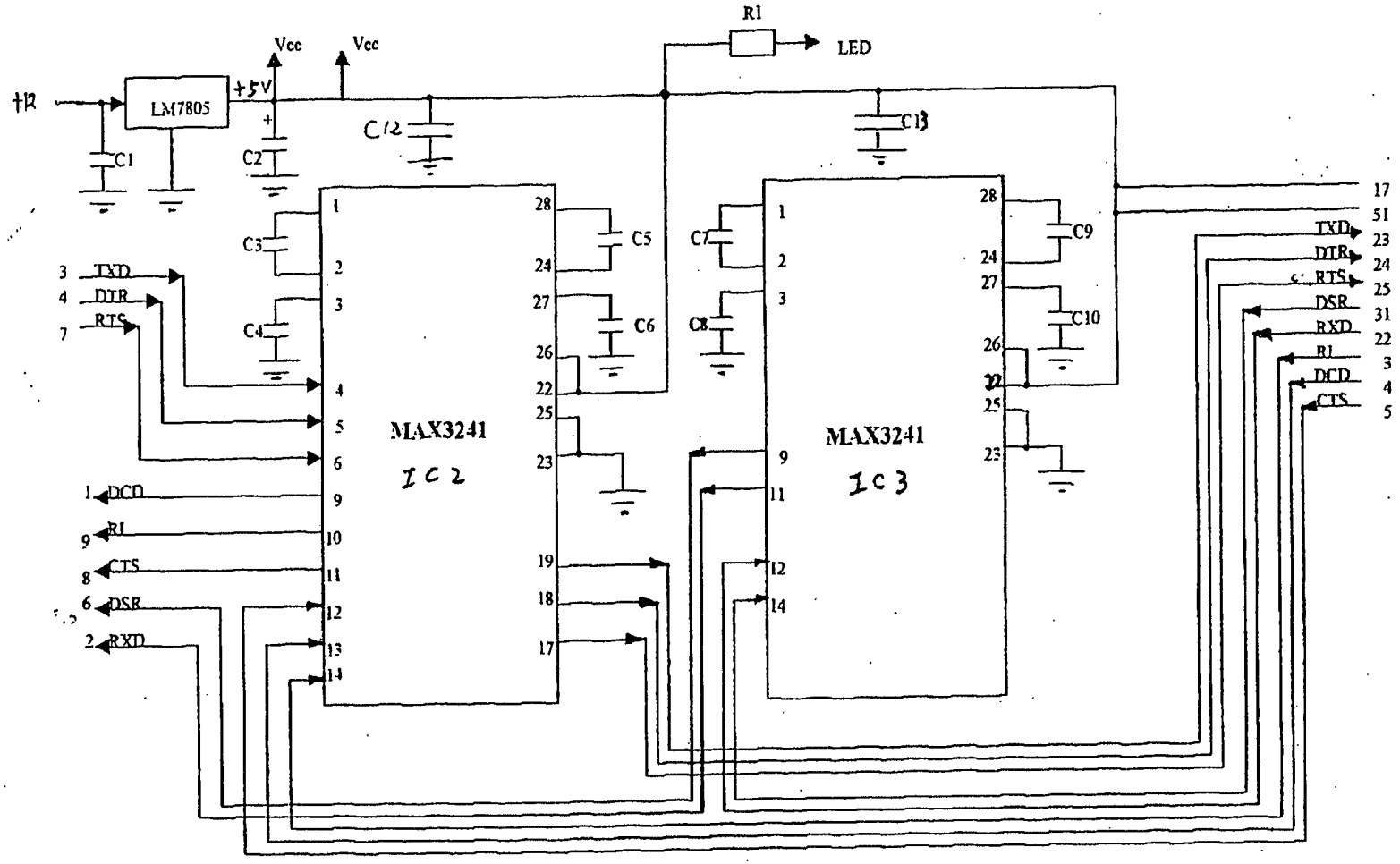
R1
LED
Vcc
Vcc
LM7805
+5V
C1
C2
C12
C13
C3
C4
C5
C6
C7
C8
C9
C10
MAX3241
IC2
MAX3241
IC3
TXD
DTR
RTS
DCD
RI
CTS
DSR
RXD
17
51
23
24
25
31
22
3
4
5

图3

Moving Object GPS Navigation Monitoring and Alarm Apparatus

The present utility model relates to the technique of a navigation satellite timing and ranging / global positioning system (GPS) and is adapted to a navigation, monitoring and alarm apparatus for cash wagons, fire engines, ambulances, mail-coaches, and vehicle for governmental and civil use.

Since a plurality of global positioning satellites was successfully launched in America and free satellite signal services were provided, the global positioning navigation system GPS has been developed quickly. However, for plural systems, it is necessary to rebuild a base station, apply for a frequency point and establish an independent ground communication network by themselves, so that a high consumption of capital and a poor data transmission security are caused and an area network is hard to be built across the areas. Due to these defects, the systems are hard to be popularized in civil use, so that the incidence of criminal cases associated with the theft and out-of-control of the outgoing vehicle stay high in our country, which courts hidden dangers for public security and production management.

An object of the present utility model is to develop a moving object GPS navigation, monitoring and alarm apparatus using global positioning satellite GPS signals and the existing global system for mobile communications GSM, for which a lower investment is made and which is easily popularized.

The object of the present utility model is implemented in such a way:

A moving object GPS navigation, monitoring and alarm apparatus, characterized in that the apparatus comprises a GPS receiver, a level translator A, a microcomputer, level translators B and C, a wireless dedicated modem for transmitting data to a monitoring and commanding center by using a short message service of the GSM network; in that the apparatus is installed on the moving object; in that an output terminal of the GPS receiver is connected to an input terminal of the microcomputer via the level translator A; in that other input and output terminals of the microcomputer are further connected, via the level translators B and C, to the wireless dedicated modem for transmitting data to the monitoring and commanding center by using the GSM network.

The present utility model is further illustrated with reference to the drawings:

Fig. 1 is an application view of the present utility model;

Fig. 2 is a circuit diagram of the level translator A in the present utility model; and

Fig. 3 is a circuit diagram of the level translators B and C in the present utility model.

Fig. 1 is an application view of the moving object GPS navigation, monitoring and alarm apparatus. The apparatus comprises a GPS receiver, a level translator A, a microcomputer, level translators B and C, a wireless dedicated modem; the apparatus is installed on the moving object; an output terminal of the GPS receiver is connected to an input terminal of the microcomputer via the level translator A; and other input and output terminals of the microcomputer are further connected, via the level translators B and C, to the wireless dedicated modem for transmitting data by using the GSM network.

The GPS signals received by the GPS receiver from more than three different global positioning satellites are level-translated through the level translator A and then transmitted to the microcomputer to perform processing of the positioning signals, thereby obtaining in real time geographical position data containing the moving object of the present utility model. These geographical position data are level-translated through the level translator B and then transmitted to the wireless dedicated modem; finally, these geographical position data are transmitted via the existing GSM communication system to the monitoring and commanding center. At the same time, the signals of an operation state, theft for assistance and the like of the moving object can also be transmitted to the monitoring and commanding center according the above procedure. On the contrary, the monitoring and commanding center can also emit geographical position and command signals for the controlled moving object, which are transmitted back to the wireless dedicated modem via the GSM communication system, then level-translated using the level translators B and C and delivered to the microcomputer. The command signal is processed by the microcomputer and then executed. Other external devices of the microcomputer further display and control the moving point, thereby realizing a duplex communication mode. The microcomputer is provided with a user database and a geographical position database for the moving object, an electronic map and software for processing the command signal and other data.

Fig. 2 is a circuit diagram of the level translator A in the present utility model. The translator A comprises an integrated circuit IC_1 and its peripheral elements; an input pin 19 of the integrated circuit IC_1 is connected to the output terminal of the GPS receiver, and an output pin 10 of IC_1 is connected to the microcomputer via an RS-232 interface; pins 26 and 22 of IC_1 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R, pins 25

and 23 of IC1 are grounded, pins 27 and 3 of IC_1 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_1 and across pins 28 and 24 of IC_1, respectively.

The translator A will perform translation between TTL level and RS232 interface level.

Fig. 3 is a circuit diagram of the level translators B and C in the present utility model; the translator B comprises an integrated circuit IC_2 and its peripheral elements; input pins 4, 5 and 6 of the integrated circuit IC_2 are connected to the microcomputer through an RS232 interface (i.e., Transmit Data TXD, Data Terminal Ready DTR, Request to Send RTS signals), output pins 9, 10 and 11 of IC_2 are connected to the microcomputer through the RS232 interface (i.e., Data Carrier Detect DCD, Ring Indicate RI, Clear to Send CTS signals), several other input pins 12, 13 and 14 of IC_2 are connected with the wireless dedicated modem (i.e., RI, DCD, CTS signals), several other output pins 19, 18 and 17 of IC_2 are connected with the wireless dedicated modem (i.e., TXD, DTR, RTS signals); pins 26 and 22 of IC_2 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R_1, pins 25 and 23 of IC_2 are grounded , pins 27 and 3 of IC_2 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_2 and across pins 28 and 24 of IC_2, respectively.

The translator B will perform translation between TTL level and RS232 interface level.

The translator C comprises an integrated circuit IC_3 and its peripheral elements; input pins 12 and 14 of the integrated circuit IC_3 are connected with the wireless dedicated modem (i.e., Data Set Ready DSR, Receive Data RXD signals), and output pins 9 and 11 of IC_3 are connected to an RS232 interface (i.e., DSR, RXD signals). pins 26 and 22 of IC_3 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R_1, pins 25 and 23 of IC_3 are grounded, pins 27 and 3 of IC_3 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_3 and across pins 28 and 24 of IC_3, respectively.

The translator C will perform translation between TTL level and RS232 interface level.

The present utility model has the following advantages:

It takes a low investment, is easily popularized, has a good security and is capable of realizing countrywide roaming on an allowable condition of the GSM network.

Embodiment: JITONG GPSS Moving Object Navigation, Monitoring and Alarm Apparatus.

Integrated circuits IC_1, IC_2 and IC_3 all use MAX3241; an eight-channel parallel GPS receiver is used.

Voltage translators 7805 are used to produce an output of 5 volt.

What is claimed is:

1. A moving object GPS navigation, monitoring and alarm apparatus, characterized in that the apparatus comprises a GPS receiver, a level translator A, a microcomputer, level translators B and C, a wireless dedicated modem for transmitting data to a monitoring and commanding center by using a short message service of a GSM network; in that the apparatus is installed on the moving object; in that an output terminal of the GPS receiver is connected to an input terminal of the microcomputer via the level translator A; in that other input and output terminals of the microcomputer are further connected, via the level translators B and C, to the wireless dedicated modem for transmitting data to the monitoring and commanding center by using the GSM network.

2. The navigation, monitoring and alarm apparatus according to claim 1, characterized in that the translator A comprises an integrated circuit IC_1 and its peripheral elements; an input pin 19 of the integrated circuit IC_1 is connected to the output terminal of the GPS receiver, and an output pin 10 of IC_1 is connected to the microcomputer via an RS-232 interface; pins 26 and 22 of IC_1 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R, pins 25 and 23 of IC_1 are grounded, pins 27 and 3 of IC_1 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_1 and across pins 28 and 24 of IC_1, respectively.

3. The navigation, monitoring and alarm apparatus according to claim 1, characterized in that the translator B comprises an integrated circuit IC_2 and its peripheral elements; input pins 4, 5 and 6 of the integrated circuit IC_2 are connected to the microcomputer through an RS232 interface (i.e., TXD, DTR, RTS signals), output pins 9, 10 and 11 of IC_2 are connected to the microcomputer through the RS232 interface (i.e., DCD, RI, CTS signals), several other input pins 12, 13 and 14 of IC_2 are connected with the wireless dedicated modem (i.e., RI, DCD, CTS signals), several other output pins 19, 18 and 17 of IC_2 are connected with the wireless dedicated modem (i.e., TXD, DTR, RTS signals); pins 26 and 22 of IC_2 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R_1, pins 25 and 23 of IC_2 are grounded , pins 27 and 3 of IC_2 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_2 and across pins 28 and 24 of IC_2, respectively.

4. The navigation, monitoring and alarm apparatus according to claim 1, characterized in that the translator C comprises an integrated circuit IC_3 and its peripheral elements; input pins 12 and 14 of the integrated circuit IC_3 are connected with the wireless dedicated modem (i.e., DSR, RXD signals), and output pins 9 and 11 of IC_3 are connected to an RS232 interface (i.e., DSR, RXD signals); pins 26 and 22 of IC_3 are connected to a +5 volt power source, the power source is connected to an LED indicating lamp through a resistor R_1, pins 25 and 23 of IC_3 are grounded, pins 27 and 3 of IC_3 are respectively grounded through a capacitor, and a capacitor is connected across pins 1 and 2 of IC_3 and across pins 28 and 24 of IC_3, respectively.

Abstract

The present utility model relates to the technique of a navigation satellite timing and ranging / global positioning system (GPS) and is adapted to a navigation, monitoring and alarm apparatus for cash wagons, fire engines, ambulances, mail-coaches, and vehicle for governmental and civil use. An object of the present utility model is to develop a moving object GPS navigation, monitoring and alarm apparatus using global positioning satellite GPS signals and the existing global system for mobile communications GSM, for which a lower investment is made and which is easily popularized. The apparatus comprises a GPS receiver, a level translator A, a microcomputer, level translators B and C, and a wireless dedicated modem; the apparatus can be installed on the moving object. The apparatus takes a low investment, is easily popularized, has a good security and is capable of realizing countrywide roaming.

Reference Numbers:

Fig. 1:

全球定位卫星：global positioning satellite
监控指挥中心：monitoring and commanding center
GPS 接收机：GPS receiver
微电脑: microcomputer
无线专用调制解调器：wireless dedicated Modem